



The surround of intermittentlyconnected wireless networks

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Context...





Ad hoc networks





Intermittently-connected mobile networks







An example: Rollernet

http://www.youtube.com/watch?v=kdkCx1xlMkl



Particularities

• Space-temporal paths





Experimenting ICMN



Infocom 2005, Sigcomm 2009



RollerNet 2008













Two Situations, the Same Representation



- Only duration
- No explicit information on the environment



Questions?

• What happens during a contact?

– Is a contact isolated?

- What are the "popular" nodes?
- Are centrality-oriented metrics efficient?

Proposal: A metric to represent a node's surround



Reasoning

- Dense areas are more prone to interference
- Nodes with more neighbors → more likely to communicate
- •We want a fine understanding of the network
 - Is the node degree enough?





Time Evolution of the Surround Indicator







Time Evolution of the Surround Indicator





Time Evolution of the Surround Indicator





Contact Expansion

•For the contact $[x, y, t_s, t_e]$ $\begin{cases} [x, y, t_s, t_1], (6) \\ [x, y, t_1, t_2], (5) \implies \text{Expansion} = 3, \\ [x, y, t_2, t_e], (3) \end{cases}$

• The expansion reflects the surround stability



Would be the degree enough?



Degree = 4 ; Surround = 3



Would be the degree enough?



Degree = 4 ; Surround = 9



Would be the degree enough?





Datasets

Infocom Trace

- Performed during Infocom conference 2005
- 41 Intel iMotes during 4 days

RollerNet Trace

- Performed during a roller tour in 2008
- 62 Intel iMotes during 3 hours



Distribution of contacts vs. surround





Distribution of contacts (CDF) vs. surround





Duration of sub-contacts according to the surround indicator





Repartition of Sub-Contacts (illustration)





Surround Indicator variation according to the Expansion





Preliminary capacity tests using epidemics

•55 nodes

- Average degree = 6~7
 - Uniform distribution
- •1 bundle \rightarrow all nodes
 - Bundle of variable size



Preliminary capacity tests using epidemics: Dissemination delay





Final remarks

Preliminary work on the capacity of DTNs

Proposal: Surround indicator

- Fine representation of dynamics
- High variability of the surround indicator
 - Impact on communication
- Still a lot to analyze
 - Project recently submitted $\textcircled{\odot}$



Current work

• Evolution of the surround through time

– So far, aggregated

 Can I expect future behaviors in function of current state?

- Online surround
- Relationship surround X degree

For different mobility and distribution patterns



THANK YOU!